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A new species and two new synonyms in the genus *Plexippus* C.L. Koch, 1846 from India (Araneae: Salticidae: Plexippina)

Новый вид и два новых синонима в роде *Plexippus* C.L. Koch, 1846 из Индии (Araneae: Salticidae: Plexippina)

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KEY WORDS: Aranei, description, Karnataka, species discovery, taxonomy, type specimen.

КЛЮЧЕВЫЕ СЛОВА: Aranei, описание, Карнатака, обнаружение вида, таксономия, типовой экземпляр.

ABSTRACT. A new jumping spider species, *Plexippus ignatius* Caleb sp.n. (♂), is described from Karnataka state, India. Two new synonyms are proposed: *Plexippus andamanensis* (Tikader, 1977) syn.n. and *P. calcutaensis* (Tikader, 1974) syn.n., are junior synonyms of *P. paykulli* (Audouin, 1826) and *P. petersi* (Karsch, 1878) respectively. A detailed description and illustrations of the studied specimens are provided.

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РЕЗЮМЕ. Новый вид паука-скакунчика, *Plexippus ignatius* Caleb sp.n. (♂), описан из штата Карнатака, Индия. Предложены два синонима: *Plexippus andamanensis* (Tikader, 1977) syn.n. и *P. calcutaensis* (Tikader, 1974) syn.n. — младшие синонимы *P. paykulli* (Audouin, 1826) и *P. petersi* (Karsch, 1878) соответственно. Приводятся детальное описание и иллюстрации всех изученных экземпляров.

Introduction

The plexippine jumping spider genus *Plexippus* C.L. Koch, 1846, presently consists of 45 described species worldwide [WSC, 2022]. Seven species are known from India, of which four species — the recently recorded *P. clemens* (O. Pickard-Cambridge, 1872) and *P. minor* Wesołowska et van Harten, 2010 [Caleb, 2016; Prajapati *et al*., 2021; Tripathi *et al*., 2022] and the common tropical *P. paykulli* (Audouin, 1826) and *P. petersi* (Karsch, 1878) — are well-known and described. The remaining three Indian species – *P. andamanensis* (Tikader, 1977), *P. calcutaensis* (Tikader, 1974) and *P. redimitus* Simon, 1902 — are poorly known and have recently been categorized as 'unrecognizable species', *species inquirenda* [Prószyński, 2017; WSC, 2022]. The taxonomic status of *P. andamanensis* and *P. calcutaensis* is discussed in the present paper, while that of *P. redimitus* still remains to be further resolved. Like several other Indian salticids, *P. andamanensis* and *P. calcutaensis* were both originally described in *Marpissa* C.L. Koch, 1846 [Tikader, 1974, 1977] and then transferred to *Plexippus* [Nenilin, 1984a,b]. The present paper deals with the description of a new *Plexippus* species from Karnataka state, India and clarification on the taxonomic status of *P. andamanensis* and *P. calcutaensis*.

Materials and methods

Live specimen was photographed with a Nikon D850 DSLR camera with a Nikkor 105 mm macro lens, illuminated by a Godox 860ii flash light with a diffuser. The specimen was hand-collected and preserved in 70% ethanol. A morphological examination of *P. ignatius* sp.n. was carried out under a Leica SAPO stereomicroscope and micrographs were taken with a Leica MC190 HD camera and processed with the Leica Application Suite (LAS) version 4.13. The type specimens from ZSI, Kolkata were examined under a Leica EZ4 HD stereomicroscope and micrographs were taken with a Leica DFC500 HD camera attached to Leica M205



Figs 1–4. General appearance of the holotype male of *Plexippus ignatius* sp.n., 1, 2 — dorsal view; 3 — lateral view; 4 — front view.
Рис. 1–4. Общий вид голотипа-самца *Plexippus ignatius* sp.n., 1, 2 — дорзально; 3 — латерально; 4 — спереди.

A stereomicroscope and processed with LAS version 3.8. Male left palp was detached and examined in detail and photographed. The epigyne was cleared in 10% KOH. Leg measurements are given as follows: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimeters (mm). The descriptive style follows Caleb *et al*. [2020; 2021]. The studied specimens are deposited in the following museums: National Zoological Collection, Zoological Survey of India (NZC-ZSI), Kolkata, India and Southern Regional Centre, Zoological Survey of India (ZSIC), Chennai, Tamil Nadu, India.

Abbreviations used in the text: AER — anterior eye row; ALE — anterior lateral eye; AME — anterior median eye; EFL — eye field length; PER — posterior eye row; PLE — posterior lateral eye; PME — posterior median eye; RTA — retrolateral tibial apophysis.

Taxonomy

Genus *Plexippus* C.L. Koch, 1846

Type species: *Plexippus ligo* C.L. Koch, 1846 (= *Plexippus paykulli* (Audouin, 1826)).

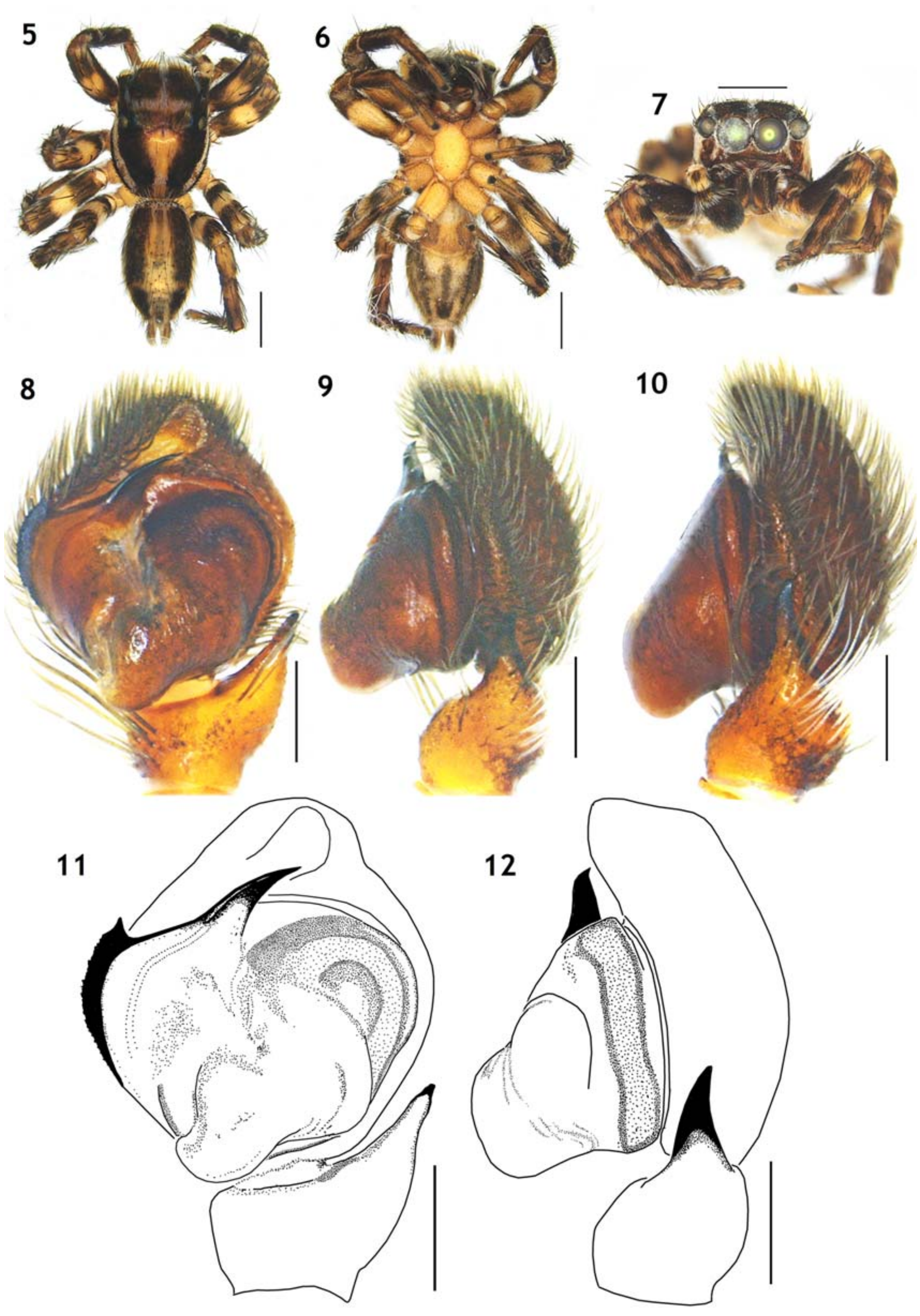
Plexippus ignatius Caleb **sp.n.**
Figs 1–12, Map.

TYPE. HOLOTYPE: ♂ (ZSIC), INDIA: Karnataka, Mandya District, Halagur, Dhanaguru village (12.3799°N, 77.1627°E), 602 m a.s.l., 12 September 2021, V.K. Bhat.

ETYMOLOGY. The specific epithet is a patronym after St. Ignatius of Loyola, the founder of the Society of Jesus, in honor for his invaluable contributions to environment and spirituality and on the occasion marking the 500th anniversary of his spiritual conversion, and the 400th anniversary of his canonization on March 12, 2022. The name is treated as a noun in apposition.

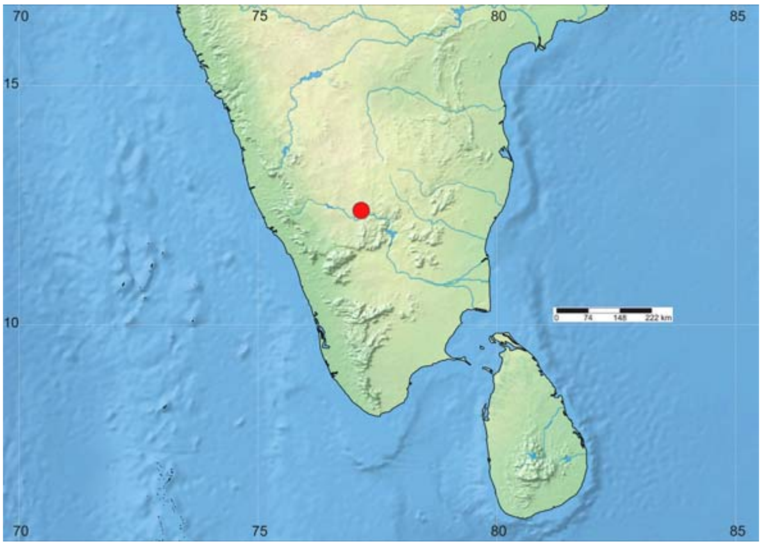
DIAGNOSIS. The male of *P. ignatius* sp.n. is morphologically similar to that of *P. clemens*, but can be recognized by the carapace colour pattern with three thin white longitudinal stripes joined by a transverse stripe in the ocular region (Figs 1, 2, 5). The palp is most similar to that of *Plexippus minor* Wesołowska et van Harten 2010, but can be readily distinguished by the proportions of the bulbus, which is notably wider anteriorly and sharply narrowing posteriorly (rounded in *P. minor*); tibia with a distinct retrolateral bulge at the base of RTA, apparent in ventral view (absent in *P. minor*); RTA protrudes at an angle of 60° (40° in *P. minor*) in ventral view; RTA thumb-like and pointing dorsad in retrolateral view (triangular and pointing apically in *P. minor*) (cf. Figs 8–12 with figs 15, 16 in Tripathi *et al*. [2022]).

DESCRIPTION. MALE: total length 4.65; carapace 2.40 long, 1.77 wide; abdomen 2.25 long, 1.33 wide. Carapace



Figs 5–12. Somatic morphology and palp of *Plexippus ignatius* sp.n., holotype male. 5 — habitus, dorsal view; 6 — ditto, ventral view; 7 — front view; 8, 11 — left palp, ventral view; 9, 12 — ditto, retrolateral view; 10 — ditto, retrolateral, slightly posterior view. Scale bars: 1 mm (5–7); 0.2 mm (8–12).

Рис. 5–12. Соматическая мофрология и пальпа *Plexippus ignatius* sp.n., голотип-самец. 5 — внешний вид, дорзально; 6 — то же, вентрально; 7 — тоже, спереди; 8, 11 — левая пальпа, снизу; 9, 12 — то же, сзади-сбоку; 10 — то же, сзади-сбоку, но более сзади. Масштаб: 1 мм (5–7); 0,2 мм (8–12).



Map. The type locality of *Plexippus ignatius* sp.n.
Карта. Типовой локалитет *Plexippus ignatius* sp.n.

black, with three short longitudinal white stripes, two behind ALEs and one from between AMEs joined by a transverse band present between posterior eye rows; ocular region covered with rusty brown setae; thoracic slope with a median patch of white hairs. Lateral sides of carapace with broad white stripes. Anterior eyes surrounded by white and reddish orbital setae (Figs 1–3, 5). Eye measurements: AME 0.51, ALE 0.30, PME 0.07, PLE 0.26; AER 1.60; PER 1.59; EFL 1.04. Clypeus height 0.10. Clypeus brown, with black hairs; oblique thin white stripes run down from lateral sides of AMEs; anterior margin fringed with white hairs (Figs 4, 7). Sternum oval, yellow-brown; labium and maxillae brown, maxillae apically paler (Fig. 6). Chelicerae brownish, covered with white hairs baso-medially. Abdomen ovoid, dark brown with medial broad longitudinal white band; lateral margin bordered by white hairs; venter yellowish brown, with light brown patches, arrow-shaped brown marking present medially, pointing posteriorly toward spinnerets (Figs 1, 2, 5, 6). Spinnerets yellow with white hairs dorsally. Legs brownish yellow, covered with rusty brown scales; all femora with a white band medially; other segments covered with white and brown hairs. Leg measurements: I 4.46 (1.42, 0.81, 0.97, 0.75, 0.51); II 4.13 (1.36, 0.73, 0.84, 0.75, 0.45); III 4.71 (1.56, 0.75, 0.94, 0.82, 0.64); IV 5.12 (1.60, 0.74, 1.02, 1.14, 0.62). Leg formula 4312. Palp as shown in Figs 8–12.

FEMALE unknown.

DISTRIBUTION. Known only from the type locality (Karnataka, India) (Map).

Plexippus paykulli (Audouin, 1826)
Figs 13–19.

Attus paykullii Audouin, 1826: 409, pl. 7, fig. 22 (D♂).

Plexippus ligo C.L. Koch, 1846: 107, figs 1168–1169 (D♂).

Plexippus paykulli: Peckham, Peckham, 1886: 296; Simon, 1903: 712, 735, figs 839–841; Żabka, 1990: 170, figs 22–25; Żabka, Gardzińska, 2017: 232, figs 1A–F, 2A–F (♂♀); Tyagi *et al.*, 2019: Supplement, figs S2.57, S3.33–36 (♂♀).

Marpissa andamanensis Tikader, 1977: 199, figs 22A–C (D♂♀); holotype ♀ and allotype ♂, in NZC-ZSI, examined, **syn.n.**

For a complete list of taxonomic references see WSC [2022].

TYPES. *Marpissa andamanensis* Tikader, 1977: HOLOTYPE ♀ (NZC-ZSI 5387/18), INDIA, South Andaman, Chiriatapu (also Chiria-Tapu/Chidiya Tapu/Chidiyatappu) village, 30.05.1971, B.K. Tikader. ALLOTYPE ♂ (NZC-ZSI 5388/18), together with the holotype.

COMMENTS. *Marpissa andamanensis* was described based on the holotype female and the allotype male from Chiriatapu village, South Andaman [Tikader, 1977]. A detailed examination of the holotype has revealed that the abdominal colour pattern and the female epigyne with slit-like, curved copulatory openings, the median epigynal pocket situated below the openings, the broad copulatory ducts and oval spermathecae are unambiguously identical with that of *P. paykulli* (cf. Figs 13–15 and figs 22A–B in Tikader [1977] with figs 24, 25 in Żabka [1990] and figs 2D–F in Żabka & Gardzińska [2017]). Based on the above observations, we have concluded that the species name *M. andamanensis* is to be treated as a junior synonym of *P. paykulli*.

The allotype male, however, is neither conspecific nor congeneric with the holotype female, belonging to *Evarcha* Simon, 1902. The general morphology, colour pattern and the genital morphology fit nicely to those of *Evarcha pococki* Żabka, 1985 (cf. Figs 16–18 with figs 184, 186 in Żabka [1985]), and hence the allotype male of *M. andamanensis* is to be re-identified as *E. pococki*.

Plexippus petersi (Karsch, 1878)
Figs 20–27.

Euophrys petersii Karsch, 1878: 332, pl. 2, fig. 7 (D♂).

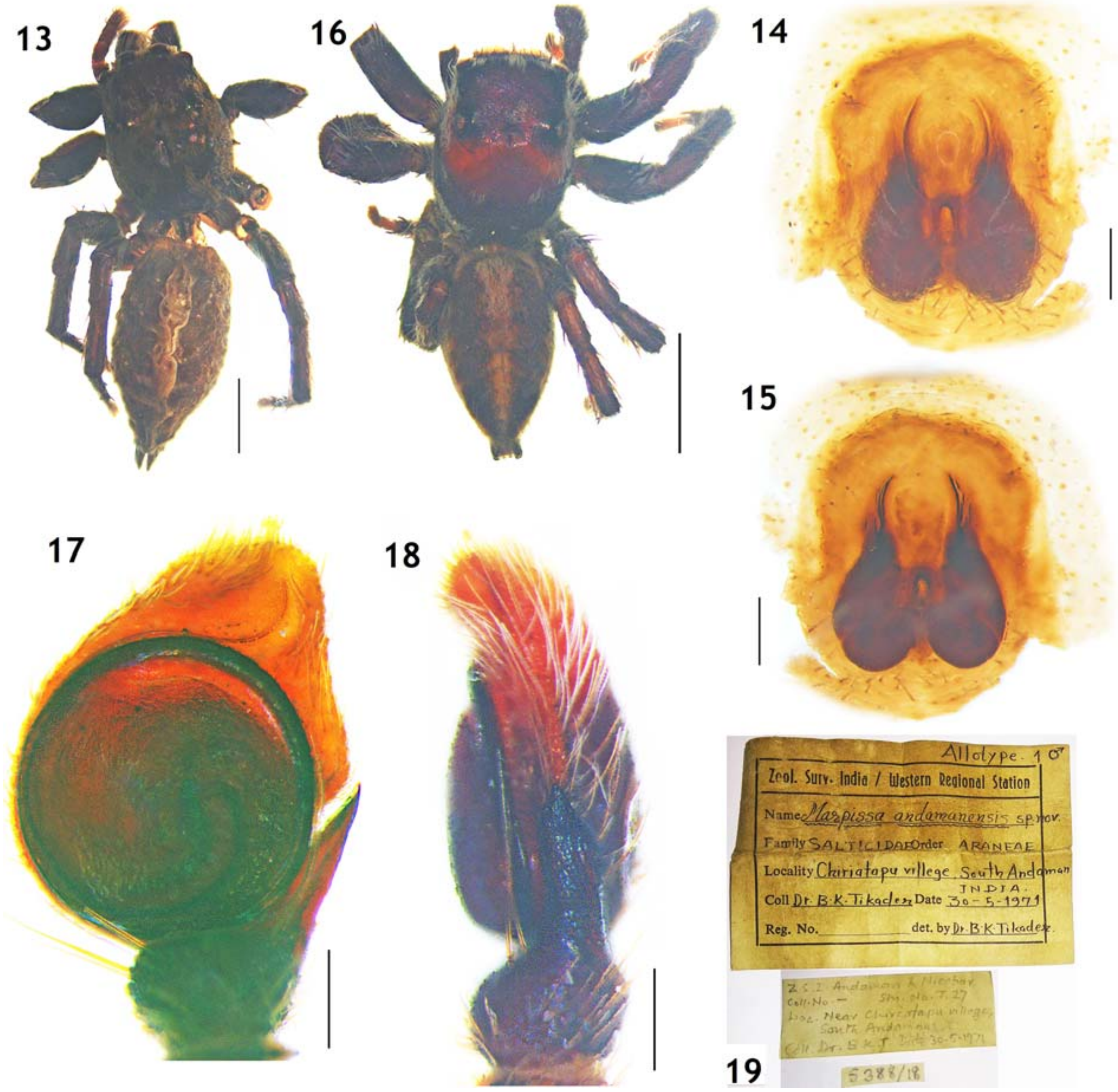
Plexippus petersi: Simon, 1903: 728; Żabka, 1985: 433, figs 464–470 (♂♀); Żabka, Gardzińska, 2017: 232, figs 3A–F, 4A–F (♂♀); Tyagi *et al.*, 2019: Supplement, figs S2.56, S3.37–40 (♂♀).

Marpissa calcutaensis Tikader, 1974: 210, figs 9–10 (D♀); holotype ♀ and paratype ♀, in NZC-ZSI, examined, **syn.n.**

For a complete list of taxonomic references see WSC [2022].

TYPES. *Marpissa calcutaensis* Tikader, 1974: HOLOTYPE ♀ (NZC-ZSI 5393/18), INDIA, West Bengal, Calcutta (now Kolkata), 12.01.1958, B.K. Tikader. PARATYPE: 1♀ (NZC-ZSI 5994/18), together with the holotype.

COMMENTS. *Marpissa calcutaensis* was described based on the holotype female and the paratype female from

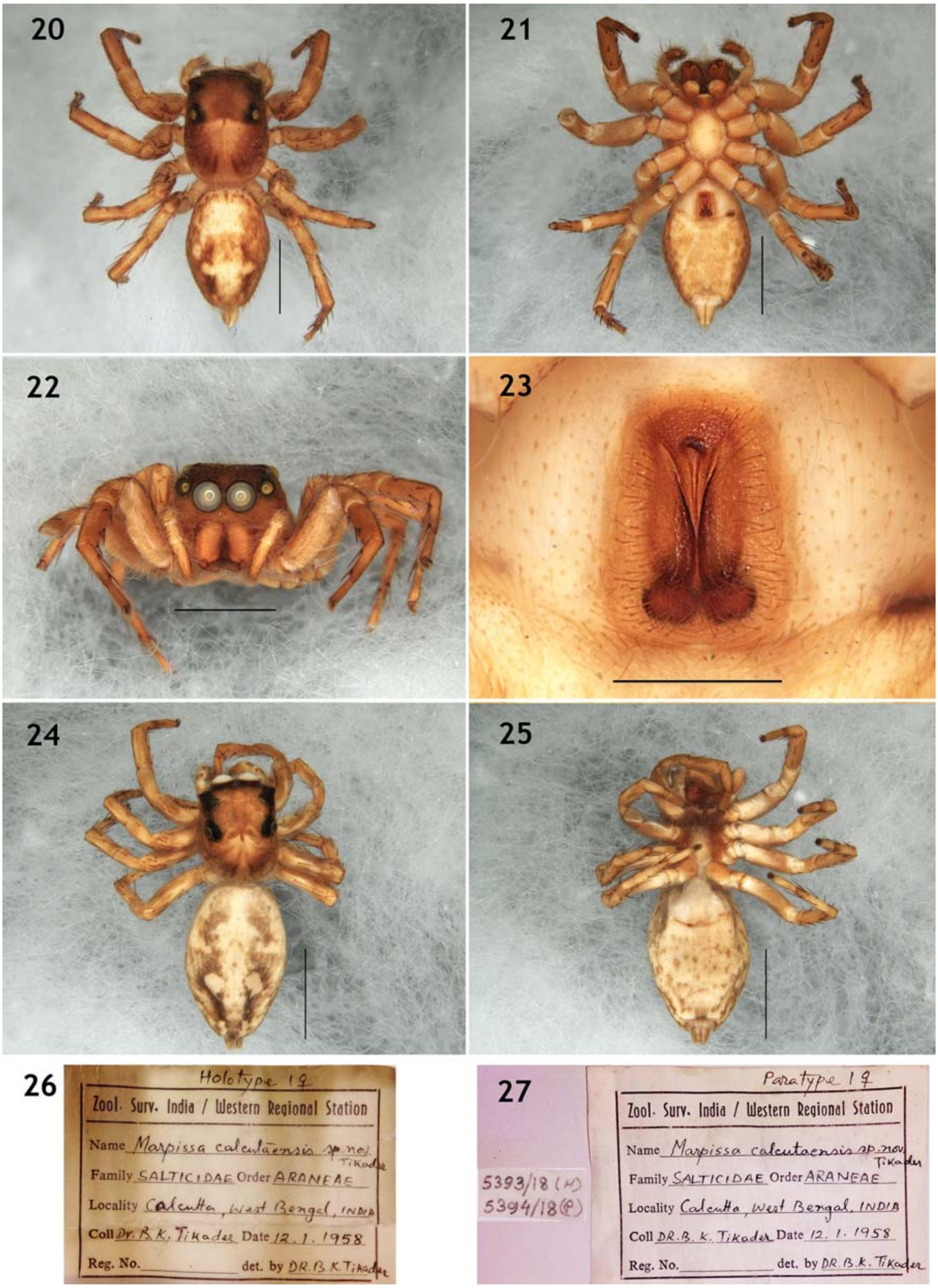


Figs 13–19. Somatic morphology and copulatory organs of *Plexippus andamanensis* (Tikader, 1977). 13 — habitus of the holotype female, dorsal view; 14 — epigyne of the holotype, ventral view; 15 — vulva of the holotype, dorsal view; 16 — habitus of the allotype male, dorsal view; 17 — left male palp of the allotype, ventral view; 18 — ditto, retrolateral view; 19 — data labels. Scale bars: 2 mm (13, 16); 0.2 mm (14, 15, 17, 18).

Рис. 13–19. Соматическая морфология и копулятивные органы *Plexippus andamanensis* (Tikader, 1977). 13 — общий вид голотипа-самки, дорзально; 14 — эпигина голотипа, вентрально; 15 — вульва голотипа, дорзально; 16 — общий вид аллотипа-самца, дорзально; 17 — левая пальпа аллотипа, вентрально; 18 — то же, ретролатерально; 19 — этикетки. Масштаб: 2 мм (13, 16); 0,2 мм (14, 15, 17, 18).

Kolkata, West Bengal [Tikader, 1974]. A detailed examination of the holotype has revealed that the abdominal colour pattern and the elongated longitudinally epigyne with a medial narrow V-shaped depression, the elongated copulatory openings and the epigynal pocket situated apico-medially match undoubtedly with those of *P. petersi* (cf. Figs 20–25 with fig. 471 in Żabka [1985] and figs 4A–D in Żabka & Gardzińska [2017]). Therefore, the species name *M. calcutaensis* is to be considered a junior synonym of *P. petersi*.

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Figs 20–27. Somatic morphology and copulatory organ of *Plexippus calcutaensis* (Tikader, 1974). 20 — habitus of holotype female, dorsal view; 21 — ditto, ventral view; 22 — ditto, front view; 23 — epigyne of the holotype, ventral view; 24 — habitus of the paratype female, dorsal view; 25 — ditto, ventral view; 26, 27 — data labels. Scale bars: 2 mm (20, 21, 24, 25); 0.5 mm (23).

Рис. 20–27. Соматическая морфология и копулятивный орган *Plexippus calcutaensis* (Tikader, 1974). 20 — общий вид голотипа-самки, дорзально; 21 — то же, вентрально; 22 — то же, спереди; 23 — эпигина голотипа, снизу; 24 — внешний вид паратипа-самки, дорзально; 25 — то же, вентрально; 26, 27 — этикетки. Масштаб: 2 мм (20, 21, 24, 25); 0,5 мм (23).

Compliance with ethical standards

Conflict of interest: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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